WHAT IS CLAIMED IS:

1. A method for reducing a piston between a plurality of optical-collection devices configured to operate as a single optical device, such that the optical-collection devices are configured to capture select portions of wavefronts, the method comprising:

pistoning an adjustable-optical path of at least one of the optical-collection devices through a plurality of steps;

collecting a set of focused images and a set of defocused images for each step;

Fourier transforming the first and second sets of images to generate respective first and second sets of spectral information for the wavefronts;

deriving a set of wavefront errors based on the first and second sets of spectral information using a phase diversity algorithm; and

deriving a piston value for the piston from the wavefront errors using a multi-color interferometry algorithm.

2. The method of claim 1, wherein each of the wavefront error is associated with a select wavelength of the wavefronts.

3. The method of claim 1, wherein the set of wavefront errors includes at least first and second wavefront errors respectively associated with first and second wavelengths of the wavefronts.

4. The method of claim 3, wherein the first and second wavelengths are less than the piston.

5. The method of claim 3, wherein the step of deriving the piston value includes:

deriving a synthetic wavelength from at least the first and second wavelengths; and

counting fringes of an interference pattern to determine the piston value.

6. The method of claim 5, wherein the synthetic wavelengths is larger than the first and second wavelengths.

7. The method of claim 5, wherein an expression for the synthetic wavelength is: $\Lambda = \lambda_1\lambda_2/(\lambda_1-\lambda_2)$,

wherein λ_1 is the first wavelength and λ_2 is the second wavelength.

8. The method of claim 1, wherein the optical-collection devices include sub-aperture telescopes forming a portion of a multi-aperture telescope.

9. The method of claim 1, wherein the optical-collection devices form a segmented primary collector.

10. The method of claim 1, wherein the phase diversity algorithm includes the Gonsalves algorithm.

11. The method of claim 1, wherein:

collecting the focused images includes generating a first set of interferograms having sample points that correspond to the steps; and

collecting the defocused images includes generating a second set of interferograms having sample points that correspond to the steps.

12. The method of claim 1, wherein the focused images include focused images of interference patterns.

13. The method of claim 1, wherein the defocused images include defocused images of defocused interference patterns.

14. The method of claim 1, wherein an amount of focus of the defocused images is known.

15. The method of claim 1, wherein collecting the set of focused images and the set of defocused images includes:

combining the select portions of the wavefronts to form a combined beam;

splitting the combined beam into first and second beams with a beam splitter;

collecting the first beam at an image plane on a first image-capture array; and

collecting the second beam a distance from the image plane on a second image-capture array.

16. The method of claim 15, wherein the first and second image-capture arrays are a single image-capture array.

17. The method of claim 1, further comprising reducing the piston of the optical-collection devices based on the piston value.

18. A method for reducing a displacement between a plurality of optical-collection devices configured to operate as a single optical device, such that the optical-collection devices are configured to capture select portions of wavefronts, the method comprising:

pistoning an adjustable-optical path of at least one of the optical-collection devices through a plurality of steps;

collecting a set of focused images and a set of defocused images for each of the steps;

Fourier transforming the first and second sets of images to derive respective first and second sets of spectral information for the wavefronts;

generating a plurality of visible indicators of the displacement from the first and second sets of spectral information using a metric; and

interpreting the visible indicators to determine a value for the displacement, the value for the displacement referred to as a displacement value.

19. The method of claim 18, further comprising calculating the metric for a wavelength value associated with each of the steps.

20. The method of claim 18, wherein a value for the displacement is indicated by a uniform-visible indicator.

21. The method of claim 20, further comprising performing pattern recognition on the visible indictors to determine the uniform-visible indicator.

22. The method of claim 18, wherein the metric is a power metric.

23. The method of claim 22, wherein the power metric is represented by the equation $Mp = (G_0{*}G_0 - G_d{*}G_d)/ (G_0{*}G_0 + G_d{*}G_d)$, wherein G_0 is a Fourier transform of an image function for the focused images and G_d is a Fourier transform of an image function for the defocused images.

24. The method of claim 23, wherein an image function is the convolution of the object function and optical system point spread function.

25. A multi-aperture telescope comprising:

a plurality of sub-aperture telescopes, wherein at least one of the sub-aperture telescopes has an adjustable-optical path;

a Fourier transform module configured to transform focused and defocused image information collected by the sub-aperture telescopes and to generate spectral information from the focused and defocused image information;

a phase diversity module configured to derive wavefront errors from the focused and defocused image information; wherein the wavefront errors are associated with select wavelengths collected by the sub-aperture telescopes; and

a multi-color interferometry module configured to derive a displacement value indicative of a displacement between at least first and second sub-aperture telescopes of the plurality of sub-aperture telescopes.